REMARKS/ARGUMENTS

I. Introduction:

Claims 1 has been amended, and claim 2 has been canceled. Applicants note that the amendments to claims 1, 7-10, 14, 21, 22, and 28-30 integer multiples of a quarter wave and/or a half wave were not added for reasons of patentability but to broaden the claims. Claims 1 and 3-30 are now pending in the application. Applicant respectfully requests reexamination and reconsideration of the application.

II. Allowable Subject Matter:

Applicant acknowledges with appreciation the Examiner's indication that claims 4-10, 16, 17, 19-21, 24, and 25 contain allowable subject matter. As discussed below, Applicant believes that all of the pending claims are now in condition for allowance.

III. Objections to Drawings and Specification:

The drawings and specification have been objected to due to various informalities. Applicant notes that the end of the second sentence in paragraph [0041] identifies element 906 of Figure 9 as "a housing." Applicant has not, therefore, amended the drawings or the specification with regard to element 906 of Figure 9. Applicant has amended, however, paragraphs [0030], [0036], and [0045] to address the Examiner's other concerns. Applicant notes that the amendments to paragraphs [0030], [0036], and [0045] merely put into words what is clearly shown in the drawings and therefore do not introduce new matter. All of the objections to the drawings and specification have thus been addressed and overcome.

IV. Rejections Based On Prior Art:

Claims 1 and 2 were rejected under 35 USC 103(a) as obvious in view of US Patent No. 4,814,689 to Obara ("Obara") and US Patent No. 5,884,236 to Ito ("Ito"). Claim 3 was rejected as obvious in view of Obara, Ito, and US Patent No. 6,449,568 to Gerrish ("Gerrish"). Claims 11-13 were rejected as obvious in view of Obara and US Patent No. 5,811,655 to Hashimoto ("Hashimoto"). Claims 14 and 22 were rejected as obvious in view of Obara. Claims 15 and 23 were rejected as obvious in view of Obara and Gerrish. Claim 18 was rejected under 35 USC 102(b) as anticipated by Hashimoto. Claims 26 and 27 were rejected as anticipated by Gerrish.

Claims 28-30 were rejected as obvious in view of Gerrish and Obara. Applicant respectfully traverses these rejections.

A. Claims 1, 3, and 11-13

Turning first to independent claim 1, that claim has been amended to include the limitations of claim 2, which was rejected in view of Obara and Ito. In rejecting then claim 2, the PTO acknowledged that neither Obara nor Tito teaches an important requirement of now claim 1, namely, the "initial frequency corresponds to one of a quarter wave, a half wave, or an integer multiple of a quarter wave or half wave with respect to an estimated length of one of said communications channels." The PTO nevertheless states that it would be obvious to modify Obara "to begin a frequency sweep test at a quarter or half wave frequency based on the estimated length of the channel." The PTO does not, however, point to any teaching, suggestion, or motivation in Obara or any other cited prior art that would lead a person of ordinary skill in the field to modify Obara to start the period T1 or T2 mentioned in column 3, lines 5-20 of Obara at either a quarter wavelength or a half wave length (or integer multiples thereof) of an estimated length of transmission line 5. And indeed no such teaching, suggestion, or motivation exists in Obara or any other cited prior art. In fact, Obara provides no teaching even that the length of transmission line 5 should be estimated prior to varying periods T1 and T2 in the process described in column 3, lines 5-20 much less starting periods T1 or T2 with a quarter or half wavelength of an estimated length of transmission line 5.

Rather than identifying a teaching, suggestion, or motivation in the prior art that would lead a person of ordinary skill in the field to modify Obara to start period T1 or T2 at either a quarter wavelength or half wave length (or integer multiples thereof) of an estimated length of transmission line 5 in the process described in column 3, lines 5-20, the PTO states that "[b]y applicant's admission this is a well known and common practice in the art for determining reflective characteristics and simplifying calculations." The PTO does not provide any citation (e.g., to the specification) to support such a statement, and indeed, the statement is not correct. In the specification, Applicant has not admitted to any knowledge in the prior art other than the simple scientific fact that a signal whose wavelength is a quarter wave or a half wave (or integer multiples thereof) of the length of a transmission line terminated in an open or a short circuit will typically generate a resonate standing wave on the transmission line. (See, e.g., the specification, paragraph [0001].) That simple scientific fact would not motivate a person of

ordinary skill in the field to modify Obara to start period T1 or T2 at either a quarter wavelength or half wave length (or integer multiples thereof) of an estimated length of transmission line 5. (See Obara column 3, lines 5-20, and Figure 1.)

In fact, although the claims are not so limited, the use of quarter or half wavelengths (or integer multiples thereof) to simplify the calibration of communications or transmission lines is one of Applicant's discoveries. As is well settled in the law, the PTO cannot rely on Applicant's own discoveries for motivation in a rejection based on obviousness. In fact, to do so, constitutes impermissible hindsight reconstruction. (MPEP 2141.01, part III.)

For all of the foregoing reasons, independent claim 1 is patentable over the combination of Obara and Ito.

Claims 3 and 11-13 depend from claim 1 and are therefore also patentable. Moreover, Applicant traverses the motivation provided for combining prior art in the rejections of claims 3 and 11-13.

With regard to the rejection of claim 3, Gerrish's stated purpose in using open and short end conditions is not to simplify calculations but to determine numerical correction coefficients for compensating for the fact that Gerrish's probes have a non-zero length. (Gerrish col. 3, lines 1-3; col. 6, lines 40-42.) Certainly, Gerrish does not teach using open and short end conditions to simplify any of the types of calculations disclosed in Obara. In fact, it appears that using open and short conditions in Obara would not simplify any of the calculations disclosed in Obara. For example, how would using open and short conditions in Obara simplify the calculation shown at column 3, line 18 of Obara? The PTO thus has not established a *prima facie* case of obviousness with respect to claim 3.

With regard to claims 11-13, the PTO has not provided any factual support for the statement that the proposed modifications would not require any alterations of hardware or software. In fact, this statement is incorrect. Using Obara's system in Hashimoto would require significant changes to Hashimoto and Obara. Indeed, how would Obara's system be added to Hashimoto without making significant changes to Hashimoto's system? Moreover, absent a teaching, suggestion, or motivation in the prior art, the mere fact that the use of an oscilloscope is common does not make it obvious to use Obara's oscilloscope-based system in Hashimoto's system. The PTO has thus also not established a *prima facie* case of obviousness with respect to claims 11-13.

B. Claims 14 and 15

Independent claim 14 includes the requirement that "said initial frequency corresponds to one of a quarter wave, a half wave, or an integer multiple of a quarter wave or a half wave of an estimated length of one of said communications channels," and claim 15 requires that the "communications channel be terminated in one of a shorted condition or an open condition." Claims 14 and 15 are therefore patentable for the reasons discussed above with respect to claims 1 and 3.

C. Claim 18

Claim 18 requires "a plurality of envelope detectors" and "a plurality of wave form detectors." In rejecting claim 18, the PTO identified the delay time counter 82 of Hashimoto as meeting both the "plurality of envelope detectors" and the "plurality of wave form detectors" recited in claim 18. The PTO does not explain, however, why a delay time counter should be considered either an envelope detector or a wave form detector. In fact, Hashimoto expressly teaches that the delay time counter 82 "measures the signal propagation delay time from the OR gate 75 to the terminals 54." (Hashimoto col. 2, lines 15-17.) Thus, as the name "counter" implies, Hashimoto's delay time counter 82 is a counter—not an envelope detector or a waveform detector. Claim 18 is therefore patentable over Hashimoto.

D. Claims 22 and 23

Independent claim 22 includes the requirement that "said initial frequency corresponds to one of a quarter wave, a half wave, or an integer multiple of a quarter wave or a half wave of an estimated length of one of said communications channels," and claim 23 requires that the "communications channel be terminated in one of a shorted condition or an open condition." Claims 22 and 23 are therefore patentable for the reasons discussed above with respect to claims 1 and 3.

E. Claims 26-30

Independent claim 26 is directed to a "method of determining a value of an impedance." The method includes "determining a first frequency" of a signal driven onto a

transmission line that produces a particular condition in a standing wave on the transmission line while the transmission line is terminated in a known impedance. The method also includes "determining a second frequency" of the signal driven onto the transmission line that produces the same condition while the transmission line is terminated in an unknown impedance. The method also includes "calculating a value of said unknown impedance." Gerrish fails to disclose any of the foregoing requirements of claim 26.

In fact, it is not surprising that Gerrish does not disclose any of the features of claim 26 because Gerrish is directed to a fundamentally different purpose. While claim 26 is directed to a "method of determining a value of an impedance," Gerrish is directed to determining correction coefficients to correct measured voltage V_V and current V_I to compensate for the fact that Gerrish's probes are not ideal probes. (See Gerrish col. 3, lines 1-3; and col. 6, lines 40-42.) Indeed, Gerrish does not calculate the value of an unknown impedance that terminates a transmission line, as would be required to meet the requirements of claim 26. Nor does Gerrish determine a first frequency of a calibration signal that causes a particular condition on the transmission line while the transmission line is terminated in a known impedance and then determine a second frequency of the calibration signal that causes the same condition on the transmission line while the transmission line is terminated in an unknown impedance. In fact, the "selected operating frequency" described in Gerrish at column 3, lines 45-49 (which the PTO equated with the second frequency of claim 26) is not a frequency that causes a calibration signal to create the same condition with an unknown impedance as the calibration signal created at the pre-selected list of signal frequencies described at column 3, lines 32-43 (which the PTO equated with the first frequency of 26) with a known impedance.

For all of the foregoing reasons, claim 26 is patentable over Gerrish. Claims 27-30 depend from claim 26 and are therefore also patentable.

V. Conclusion:

In view of the foregoing, Applicant submits that all of the claims are allowable and the application is in condition for allowance. If the Examiner believes that a discussion with Applicant's attorney would be helpful, the Examiner is invited to contact the undersigned at (801) 323-5934.

Respectfully submitted,

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